

system 100 utilize 511 individual long codes, while the synchronized base stations within communication system 100 utilize a single, time shifted long code. GIC/LC control 209 determines the current system status, and if the current system status is "synchronized," then GIC/LC control 209 instructs switching circuitry 222 to supply a first long code (LC1, where LC1 is the single long code utilized by synchronized base stations) to spreading circuitry 217, 219. Additionally, during synchronized operation GIC/LC control is supplied a "time offset" for LC1 and delays LC1 (via delay circuitry 224) accordingly. The appropriate system time is GPS time supplied by system status unit 211. If GIC/LC control 209 determines that the current system status is "unsynchronized," then GIC/LC control 209 supplies a second long code (LC2, where LC2 is chosen from the group of 511 long codes used for unsynchronized systems) to spreading circuitry 217, 219. After further spreading by spreading circuitry 217, 219, the resultant signals are summed by summing circuitry 225, filtered by a transmit filter and amplified by a linear power amplifier 227, and transmitted to remote unit 113.

As discussed above, for control channel transmission, the long code sequence is periodically masked over one data symbol interval (short code length) allowing the CSC to periodically appear M times in each long code period. The masking is accomplished by switching circuitry 207. In particular, when switch 207 is "open," no long code is supplied to spreading circuitry 217, allowing only the unspread CSC to be input into summing circuitry 225. As discussed above, remote units 113 within communication system 100 exploit the fact that the GIC periodically appears in the long code to narrow the search range of the long code. During the time period when the CSC is unspread, a GIC is supplied to summing circuitry 225 to be amplified (by amplifier 227) and transmitted to remote units 113 within communication system 100. Unlike prior art methods of GIC transmission, GIC/LC control 209 determines a particular GIC to transmit based on the current system status. In particular, if GIC/LC control 209 determines that the current system status is "synchronized," then GIC/LC control 209 instructs switching circuitry 221 to supply a first GIC (GIC1) to summing circuitry 225. If GIC/LC control 209 determines that the current system status is "unsynchronized," then GIC/LC control 209 supplies a second GIC (GIC2) to summing circuitry 225. As discussed above, to avoid searching through every single long code, the GIC is broadcast indicating a long code group to which the long code of each base station belongs.

FIG. 3 is an illustration of signals transmitted from a base station of FIG. 1 in accordance with the preferred embodiment of the present invention. During the transmission of LC1 or LC2 (represented by signal 301), switching circuitry 207 periodically opens, ceasing transmission of LC1 or LC2. The resulting signal (shown as signal 303) has the CSC periodically appearing during each long code period. During the times when CSC periodically appears, GIC1 or GIC2 is transmitted (signal 305) from base stations 101, 102.

FIG. 4 is a flow chart showing operation of the base station of FIG. 1 in accordance with the preferred embodiment of the present invention. The logic flow begins at step 405 where GIC/LC control 209 obtains the current system status and GPS time. In particular, GIC/LC control 209 is supplied the current system status (synchronized/unsynchronized) by system status/GPS time supply 211. Next, at step 410 GIC/LC control 209 determines if the system status has changed. If, at step 410 GIC/LC control 209 determines that the system status has changed (i.e.,

synchronized to unsynchronized or unsynchronized to synchronized) then the logic flow continues to step 415, otherwise the logic flow returns to step 405. At step 415 GIC/LC control 209 determines if the base station is operating in a synchronized mode, and if so, the logic flow continues to step 420. At step 420 GIC/LC control 209 manipulates switching circuitry 221 to pass a first GIC to switching circuitry 207. In particular, at step 420 switching circuitry 221 passes GIC1 to switching circuitry 207. Next, at step 425, GIC/LC control 209 manipulates switching circuitry 222 to pass a first long code (LC1) to switching circuitry 207. In addition, at step 425 GIC/LC control appropriately delays (via delay circuitry 224) the first long code a predetermined amount for proper base station identification. The logic flow continues to step 440.

Returning to step 415; if GIC/LC control 209 determines that the base station is not operating in a synchronized mode the logic flow continues to step 430 where switching circuitry 221 passes a second GIC (GIC2) to switching circuitry 207. Next, at step 435, GIC/LC control 209 manipulates switching circuitry 222 to pass a second long code (LC2) to switching circuitry 207. The logic flow continues to step 440. At step 440 switching circuitry 207 periodically masks the current long code sequence over one data symbol interval, while simultaneously broadcasting the current GIC.

Supplying the current GIC in such a way to indicate whether the base station is operating in a synchronized or an unsynchronized mode allows remote units acquiring base stations to vary their searching algorithm based on the communication system's synchronization status. Thus remote units will vary their searching algorithm based on the base station's synchronization status, allowing remote units to operate with synchronized base stations yet be able to operate in geographic areas where accurate time synchronization is unavailable, or continue to operate when time synchronization fails.

FIG. 5 is a flow chart illustrating operation of the remote unit of FIG. 1 in accordance with the preferred embodiment of the present invention. The logic flow begins at step 501 where remote unit 113 accesses available control channels (CCHs) to determine a base station with a strongest control channel. In the preferred embodiment of the present invention, base stations within communication system 100 continuously broadcast a control channel (via downlink communication signal 116) that is utilized by remote unit 113 in accessing communication system 100. Once remote unit 113 has determined a base station having a strongest control channel (in this case, base station 101), the logic flow continues to step 505 where remote unit determines a particular long code being utilized by base station 101. As discussed above, remote unit 113 detects the long code timing by searcher 131. Searcher 131 searches for the periodically appearing CSC masked over the long code to determine the phase of the long code. Once the long code phase has been detected, searcher 131 receives the GIC, indicating the group of long codes (e.g., group 1 (GIC1)) to which the base station's long code belongs. The logic flow continues to step 510 where searcher 131 accesses GIC data base 114 to determine if base station 101 is operating in a synchronized mode. If at step 510, remote unit 113 determines that base station 101 is operating in a synchronized mode, then the logic flow continues to step 515 where remote unit 113 searches the entire length of a single long code utilized for all synchronized base stations within communication system 100. If at step 510 remote unit 113 determines that base station 101 is not operating in a synchronized mode, then the logic flow continues to step